


 Description of
 DE19526533

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The invention relates to an exposition device for with gas and/or particulate admixtures, in particular cigarette smoke of enriched gaseous mixtures reviving cell cultures.

It is known to expose living cell cultures to the influence toxicological or in other form on these acting gas or particulate admixtures in order to investigate their effect on the living cells.

Here frequent problems arise to difficult with the dosage of the admixtures and it are to be determined, with which amount the cell cultures actual exposed are. An other problem arises as a result of the fact that the living cells with a nutrient solution supplied to become to have, which in the gaseous mixture so far as possible is to be extracted from the influence of the admixtures.

It is therefore object of the invention creating an exposition device with a dosed exposure the living cell cultures with gas and/or particulate admixtures enriched gaseous mixtures, in particular cigarette smoke, possible and a small impairment with the supply of a nutrient medium caused, will create.

This object becomes according to invention by the features of the claim 1 dissolved. Advantageous embodiments and development of the solution according to invention result in the case of application in the subordinate claims contained features.

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In the formed according to invention exposition device the living persons know cell cultures, which becomes direct exposed with corresponding enriched gaseous mixture, which will be usually air. With studies of the influence of cigarette smoke on the living cell cultures the exposition device is to a smoke generator connected and preferred in an incubator A taken. In

the incubator preferably conditions of approx. can. 98% RH, 10% CO₂ and a temperature of 37 DEG C to be kept.

The cigarette smoke generator can produce, by means of a computer controlled, a smoke, which $m < \text{between } 100 \text{ to } 1500 \text{ mg ever}; 3 >$ Tobacco smoke contains. The so enriched air mixture becomes guided over a feed line into the exposition device and in this to at least a carrier for the living cell cultures passed direct over an inlet system. It can be however also a distribution system present, in which the enriched air is conductible to several carriers for same cell cultures. The enriched air mixture from above arrives over the inlet system, direct at the single cell cultures. These are applied on a permeable membrane, which from downside with an other inlet system for the nutrient medium in compound. The nutrient medium can become thereby direct to the cell cultures guided, without it is the direct influence of the exposing gaseous mixture ausges.

The whole system, to which the exposition device belongs, secures a static exposure with fresh solved cigarette smoke in the air flow. Become the Rauchparikelkonzentration, the course duration in the smoke generator and the actual smoke exposition time variable, but for single T constant adjusted.

The smoke generator propelled with a stepper motor supplies for example 3.5 ml to 2 seconds., with a dilution factor of 2,85. The generated smoke becomes from the incubator with prepared air, already specified, mixed, whereby the dilution relationship with the promotion rate of the before-diluted cigarette smoke becomes adjusted. In the inlet system, before the exposition device, valve can be that opened will and the enriched air mixture can arrive into the exposition device. After a predetermined time will this again closed and the exposure of the living cell cultures with the air mixture enriched with cigarette smoke can begin, if a simultaneous valve located at the air removal system is closed.

The nutrient medium can become over an additional inlet system with the help of a pump direct to the permeable membranes, are arranged on which the living cell cultures, guided. The dosage made here by a corresponding control and/or. Control of the pump.

The determination of the instantaneous concentration of the mixed cigarette smoke becomes determined with an aerosol photometer. On the other hand the absolute concentration quantity can become, by means of filters with standard testing methods determined.

It is particularly favourable, in order to increase the separating rate of particles to the membranes to arrange an electrostatic separating device which uses the particles contained in the air mixture immanent charge. The use of such a electrostatic separating device secures a complete deposition on D membranes.

Additional one can for uncharged particles a corresponding loading device provided ss,

which can already be direct at the air inlet or before the actual exposition device arranged. With this loading device particles the corresponding negative or positive polarized can become and it are thus possible to separate all particles quantitative. With knowledge of the exposition concentration then also the actual dose arrived at the cells is assignable, so that the actual exposure of the cells targeted influenced can be reconstructed and for subsequent studies more reproducible.

Subsequent one is to become the exposition device according to invention at an embodiment more near described.

Shows the single fig, a sectional view of an exposition device using an electrostatic separating device.

The exposition device represented in the fig is connectable to a not represented smoke generator and in a likewise not represented incubator received. With cigarette smoke the enriched air arrives by a central in a cover plate 1 arranged smoke entrance opening 2, into the device. The cover plate 1 consists thereby of stainless steel and the central smoke inlet port 2 exhibits a diameter of 3 mm.

The cover plate 1 is with one likewise from stainless steel existing bottom plate 4 and a smoke-distribution-planar 11 by means of quick-locking mechanisms 12 more connectable. From Teflons the existing and/or. so that coated smoke-distribution-planar 11 an inlet system 3 exhibits, star and channel shaped formed is, whereby the single channels 3 extended openable chambers conical in itself end and the enriched air mixture from above becomes in the respective chamber on cell cultures 6 passed. With this embodiment is above the cell cultures 6, in which respective chamber, a metal filter 7, which is 10 connected with an high voltage source and forms the common electrostatic separating unit.

Over a likewise channel shaped formed exhaust air system, with smoke the enriched air, over a central Luftabzug 13, can become from the chambers remote.

Below the cell cultures and discharges are 5 present for the nutrient medium for the living cell cultures, which are connected with a likewise not represented pump and a reservoir.

In this representation the permeable membranes, are 6 arranged on which the cell cultures, are not more recognizable.

Between the bottom plate 5 and the smoke-distribution-planar 11, carrier plates become 8 for Transwells 9 maintained at the respective chambers.


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1. Exposition device for with gas and/or particulate admixtures of enriched gaseous mixtures reviving cell cultures, with which that is conductible defined enriched gaseous mixture over an inlet system direct to at least a carrier for the living cell cultures, is conductible characterised in that the nutrient medium over an other inlet system (5) from downside by a permeable membrane to the cell cultures (6) and is the inlet system (3) for the enriched gaseous mixture so formed that it affects from above the cell cultures (6) exposing.
2. Exposition device according to claim 1, characterised in that the enriched gaseous mixture at an electrostatic separating device (7, 10) past is conductible.
3. Exposition device according to claim 2, characterised in that the part of the electrostatic separating device (7), acting on the gaseous mixture, above the cell cultures arranged is.
4. Exposition device according to claim 2 or 3, characterised in that the electrostatic separating device from one with an high voltage source (10) connected metal filter (7) formed is.
5. Exposition device according to claim 1, characterised in that in the range of the entry (2) of the enriched gaseous mixture a loading device arranged is.
6. Use of the exposition device according to claim 1, to the exposure of living cell cultures with cigarette smoke.

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